Wildland-Urban Interface Building Codes

California Department of Forestry and Fire Protection
Office of the State Fire Marshal

Walls

Exterior walls shall be

- of approved noncombustible or ignition resistant material, ***or***
- heavy timber or log wall construction, ***or***
- shall provide protection from the intrusion of flames and embers in accordance with SFM 12-7A-1 [Exterior Wall Siding and Sheathing].

Concerns with exterior siding:

- Flame penetration through the wall and into the stud cavity, and
- Flame spread up the wall to the soffit/eave area, potentially entering the attic and igniting combustibles there.

These photos are from a fire demonstration, and are intended to show what makes siding products vulnerable. SFM 12-7A-1 evaluates how readily flame will penetrate into the lap joint and move into the stud cavity. Indirect information about flame spread can be obtained by monitoring the number and elevation of penetrated lap joints.

Penetration into stud cavity at a lap joint (as viewed from the back side of the siding)

Flame spread up the wall to the soffit / eave area

- SFM 12-7A-1 … evaluates potential for flame penetration into the stud cavity.

Exposed side

Unexposed side

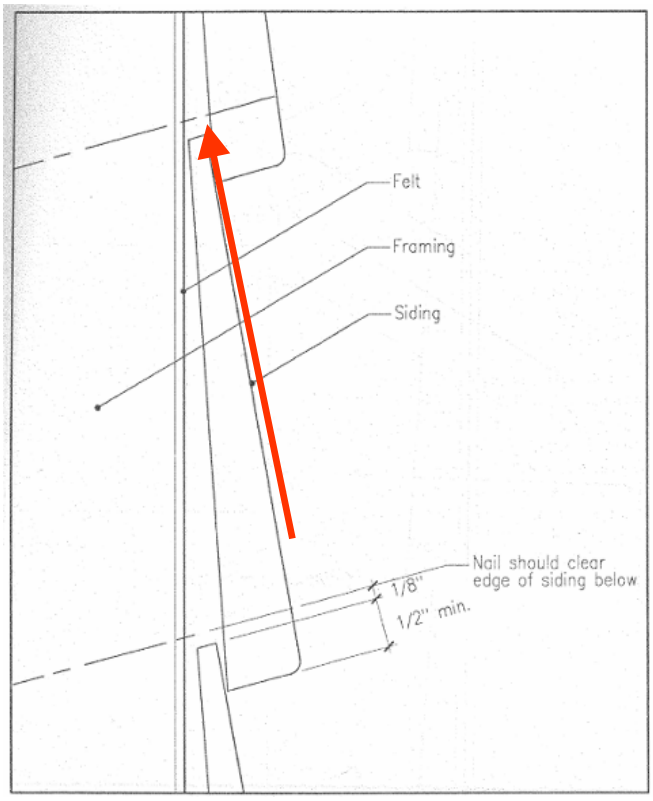
150 kW burner output, 10 minute exposure, plus 40 min observation

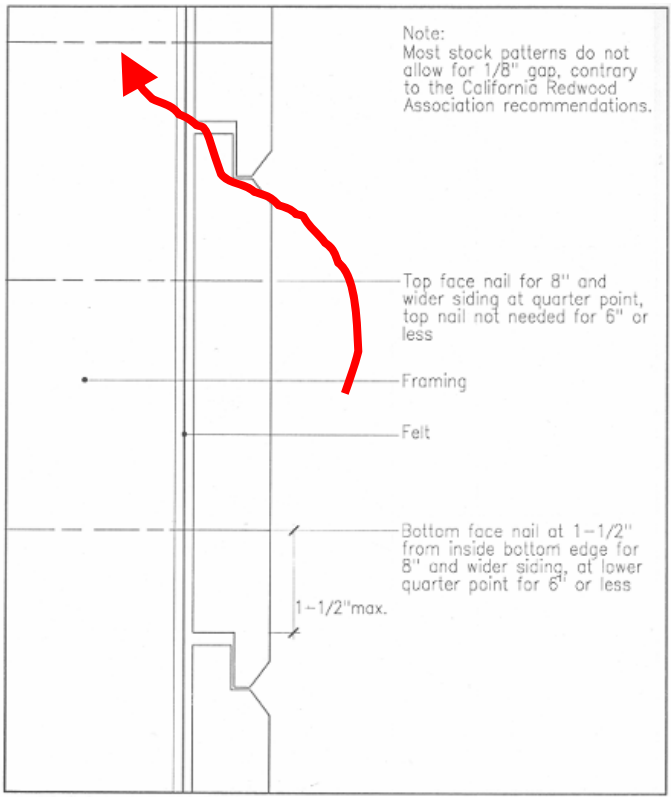
Burn through at lap joints. As constructed, this wall does not pass

(These are photos taken at the University of California Fire Research Laboratory during testing of siding.)

Combustible Siding Products

More complicated the lap joints (i.e., shiplap and tongue and groove) provide more resistance to the penetration of fire when subjected to a flame impingement exposure.





Plain bevel lap joints are vulnerable to flame penetration at the joint. Joint penetration - 1:15 minutes

More complicated lap joints, such as this shiplap joint, are more difficult to penetrate. Joint penetration - 21:20 minutes

Source for figure: Dost and Botsai, 1990, *Wood: Detailing for Performance*

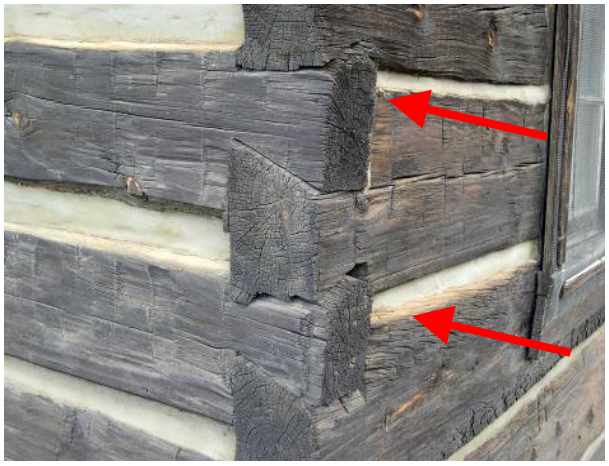
Exterior Walls

Vinyl siding warped from heat. It won't sustain combustion once the other combustible materials have been consumed. Performance of vinyl clad exterior walls will largely depend on the performance of the underlying sheathing (if present).

Photos courtesy of Cliff Hunter, Rancho Santa Fe FPD

Log Construction (limits penetration into home, vertical flame spread not affected with this option).

Char rate for wood ~1.5 in/hr under ASTM E-119 exposure.



Chinked-style log buildings

- Some chinking has been subjected to ASTM E-119 exposure, and passed. Recall that an ASTM E-119 exposure is more severe the wildfire exposure anticipated during the development of Chapter 7A. Still, with these designs, the between log joint is more vulnerable than the log itself.
- The vulnerable location won't be the log, it will be the between log joints. The caulking needs to provide equivalent protection from the fire.
- With chinked-style log homes, a space is intentionally incorporated between log courses. Chinking is a filler material. Modern chinking is reported to have good adhesion and elastomeric properties. Some brands have successfully passed an ASTM E-119 test

Example of between-log joints with hewn logs

Similar to tongue and groove and shiplap joints with horizontal siding products, more complex between-log joints will provide greater protection from the penetration of flame into the living space of the log home.

Products that will comply with SFM 12-7A-3 (without sheathing):

- Fiber cement siding products (lap or panel)
- Wood composite panel siding products, vertical lap joint
- Solid wood horizontal siding products, ship lap or tongue and groove lap joint
- Three-coat stucco (traditional)

Exterior Wall Vents

- Vent openings … shall resist the intrusion of flame (A performance-based option for compliance. Currently we don't have a standard (accepted) procedure to evaluate ember and flame intrusion. A standard is currently being developed in an ASTM committee and several products in acceptance process), **or**
- Vents shall be screened with a corrosion-resistant, non-combustible wire mesh with ¼" openings or equivalent.